

Sustainable innovation: Which actions contribute to entrepreneurial innovation in global market?

Eduardo Simprini
Delton Lehr Unglaub
Teresa Costa
Luisa Carvalho
Simone Galina

Abstract

The objective of this study is to examine the factors that enabled companies to develop sustainable innovation in process and in product. In this way, this paper intends to contribute to knowledge through the implementation of the essential practices in innovation and sustainability that have been successful in market. To this end, the research consisted in analysing the practices of companies that got highlighted in questions of global corporate sustainability and innovation. The method is divided into four steps. 1) Data collection on the ranking of the most sustainable companies and most innovative companies in the world; 2) Comparison in order to find out which companies are part of both classifications; 3) Quantitative analysis of ratings, and 4) Qualitative analysis of information obtained on sites of innovative and sustainable businesses. The main contributions and results of this study were: a) Verification of the use of innovation to achieve significant results in sustainable development, b) Confirmation of the importance of innovation in sustainable products and processes for organizations that provides new products and new services to the market, and its impact in the production process as well as in the environment in which they operate.

Key words: Innovation, Sustainability, Process, Products.

Código JEL: M10; M14; M15.

1. Introduction

Although the environmental issue is globally discussed since the 1990s, environmental problems have intensified ever more, which leads to changes in the meaning and importance of sustainability. Consequently, the business decisions making focused on sustainable processes became increasingly relevant (Ulhoi and Madsen, 2009; Rohrbeck et al., 2013). Parallel to this, a theme that is also becoming increasingly important is sustainable innovation (Angelo et al. 2012). Sustainable innovations often consist of incremental improvements within an organization, rather than radical innovations that create new markets and solve major societal challenges (Rohrbeck et al., 2013). We adopted the definition of sustainability innovations as “inventions in technology, process or market that simultaneously create economic and societal value. Societal value can be differentiated in protecting the environment, ensuring economic growth and advancing social well-being” (Rohrbeck et al. 2013, p.6). Thus arises the key issue for the development of this paper, what actions companies considered innovative and sustainable perform to stand out in the global market? This article aims to determine the factors that enabled companies to stand out at both innovation and sustainability. In this way, it intends to contribute with knowledge to the implementation of good essential practices in these requisites, besides showing the interaction of innovation and sustainability factors that determine the creation of new products and services that were successful in the market.

2. Theoretical approach

2.1. Corporate Innovation

Traditionally, innovation is related with technological advances that are the main determinants of economic development. Due to the process of creative destruction, thus innovation revolutionizes the economic structure from within (Schumpeter, 1943). However this concept has evolved over time. This trend is demonstrated in table 1:

Table 1- Concept of Innovation: Literature Review

Concept of innovation	Author
The innovation is based on a break or discontinuity over the past, associating the term "creative destruction" which is related with a radical break with the past.	Schumpeter (1934)
A tool of entrepreneurs, through which they exploit change as a new opportunity for a new product or service.	Drucker (1985)

Innovation is a cumulative process, with the impossibility of separating invention, innovation and diffusion.	Lundvall (1992)
Conversion of an idea to the first use or sale.	Utterback (1996)
The first commercial production or implementation of a new product or process, assuming the crucial contribution of the entrepreneur in connecting new ideas with the market process.	Freeman and Soete, (1997)
Creation of new knowledge, a new recombination of existing knowledge, innovation is primarily related to knowledge.	Deakins and Freel, (2003)

Source: Elaborated by authors

Other authors such as Patier (1984), criticized the misinterpretation of the concept of innovation, stressing the need to extend the concept to other fields of knowledge. To Chesbrough (2003), the increased availability of knowledge, the popularization of the Internet, the increase of companies entering the capital market as well as expanding the scope of possible external suppliers undermined the effectiveness of the traditional innovation system.

2. Corporate Sustainability

In recent years, the increased focus on sustainability and business is also understood as a way to not lose market share (Lee and Saen, 2012; Pope et al., 2004). Therefore, environmental and social issues, in addition to shareholder demands, are contributing to companies to consider sustainability a more relevant and organizational objectives in this topic. However, the challenge for companies and industries is to demonstrate how they can contribute actively in society and obtain profit providing improvements for future generations through the Corporate Sustainability (Schaltegger and Burritt, 2005).

The term Corporate Sustainability refers to a company which include the list of priorities of the organization's social and environmental concerns activities. Thus, business operations and interactions with stakeholders are modified by sustainable vision (Van Marrewijk and Werre, M., 2003). The economic, environmental and social dimensions are the most relevant dimensions present in the literature (Pope et al., 2004). This view corresponds to the idea of triple bottom line, a concept developed by Elkington (1999, 2004), which simultaneously balances the economics, environmental and social goals from a microeconomic point of view.

The most commonly used definition of Corporate Sustainability is the one proposed by the World Commission on Environment and Development (1987, p. 43), that considerer that sustainable development is the "development that meets present needs without compromising the ability of future generations to meet their needs".

2.2 Sustainable Innovation

The urgency of sustainable innovation has been internationally recognized as a vital solution for a sustainable future, with major economic and business opportunities (Charter and Clark, 2007). However, societies, economies and markets are still far from making necessary changes to create widespread demand for sustainable products and services and thus generate demand for sustainable innovation (Paraschiv et al, 2012) changes. Hence arises a space in the market for sustainable products and services. Charter and Clark (2007) argue that sustainable innovation is a process in which the variables that are part of the base triple bottom line (social, environmental and economic), are integrated into the enterprise system from the generation of ideas and R&D to commercialization of the product final - applying to products, services or technologies.

According to Kemp and Pearson (2008), sustainable innovation (eco-innovation) is characterized by the production, assimilation, exploitation of a product, process or new management method, which results throughout the lifecycle of the company or its products, reductions in environmental hazards, pollution, negative impacts of resource use.

Sustainable innovation can be characterized by the introduction (production, assimilation or exploitation) of products, processes, or business management methods, new or significant improvements to the organization that brings economic, social and environmental benefits compared to relevant alternatives (Paraschiv et al, 2012). The reference "compared to relevant alternatives" is essential to the concept of sustainable innovation, because the expected benefits need not be significant or negligible in all three dimensions of sustainability (Barbieri et al, 2010).

3. Methodology

The methodology consisted of analyzing the practices of companies that achieved global prominence in questions of sustainability and corporate innovation. The research method is divided into four steps:

- 1) Collection of data on the ranking of the most sustainable and innovative companies in the world.
- 2) Comparison to find out which companies are part of both rankings.
- 3) Quantitative ranking analysis.
- 4) Qualitative analysis of the information obtained on the websites of innovative and sustainable companies.

In step 1 were related to sustainability and innovation companies. To the topic of sustainability, the ranking was used - Global 100 Most Sustainable Corporations in the World, made by Corporate Knights. To the topic of innovation, the ranking was used - The World's Most Innovative Companies 2013 conducted by Forbes. In step 2, the companies listed in the classification of pointed questions in both surveys were separated for the proposed analyzes. To perform the quantitative analysis, in step 3, we used a method of analysis of means to verify the existence of relationship between sustainability and innovation. Compared to companies that are innovative and sustainable (designated as group 2), with the remaining that are sustainable (designated as group 1) and those that are innovative (designated as group 1) in their respective rankings. A test medium T-Student was performed using the statistical program "Software Action" version 2.4.163.322, which operates in R platform (PORTAL ACTION, 2012). For qualitative analysis, in step 4, were found on sites of sustainable and innovative, evidence of sustainability and innovation based on the available information, product and process. After, we classified according to the level of sustainable innovation (Stevens, 1997) as shown on table 2.

Table 2- Level of sustainable innovation

Level	Name	Description
1	Incremental	Progressive or small incremental improvements to existing products.
2	Re-design or green Limit	Major re-design of existing products (but limited the level of improvement that is technically feasible).
3	Alternative functional products	New concepts of product or service to meet the same functional need, for example, teleconferencing as an alternative to business travel.
4	Systems	Project for a sustainable society.

Classification Concerning the level of sustainable innovation
Source: Charter and Clark, 2007, adapted by the authors.

3.1. Classification of sustainability

The method used to define the 100 most sustainable companies in the world will be detailed below. 1) It was excluded from the analysis all companies that do not advertise at least 75% of "priority indicators" in its respective industry group performance for the year 2011. A priority indicator is one of 12 key performance indicators (ID) used in the research model which is distributed in at least 10% of all firms in an industry group. Second step: all companies with a score of F-score below 5 are deleted. The F-score is a measure of the financial strength of a company. F-score is the sum of the scores from each of the nine indicators. The indicators are: i) net income is positive, ii) the operating cash flow is positive; iii) net income ÷ total assets at the beginning of the year, about the same number of the previous year are positive iv) cash flow operating is greater than net income, v) long-term debt by ÷ average assets has not increased; vi) current ratio (short-term debt ÷ by average assets) increased; vii) any increase in equity over the previous year; viii) the gross margin improved compared to the previous year, and ix) asset turnover increased. Third step: all companies with a rating of Global Industry Classification Standard (GICS) that relates to the manufacture or distribution of tobacco products or weapons are eliminated. Fourth step: all businesses that have suffered sanctions "CK Financial Sanctions" are eliminated. CK sanctions measure the amount of money that companies have paid in fines, penalties or similar in the year. A keyword search for "fines, penalties or settlements" is performed for each company in a database of news from various companies, provided by Dow Jones. The resulting relationship generates a ranking for specific sector, such that companies are only compared with their counterparts in the same industry. Companies with less than or equal to 25% percent are eliminated.

3.2. Classification of Innovation

The ranking used in the research was prepared by Forbes with the list of most innovative companies in the world. The method is based on the ability of investors to identify companies that are innovative now and will in the future. Companies are ranked by their innovation award.

The "Innovation Award" is the ratio of the market value of a company that cannot be accounted from the net present value (NPV) of cash flows for its current products in their current markets cash. The method uses the difference between the market value and the net present value of cash flows of existing businesses, based on a formula of HOLT (Division of Credit Suisse) platform. The difference between them is the bonus given by investors on the "educated" guess that the company will continue or not on profitable growth. A minimum of 1% of expenditure on R&D as a percentage of sales was required, so the banks are not part of the list, not the energy companies and mining, whose market value is more linked to commodity prices than will innovation.

To calculate, first, we used a projected profit of a company (cash flow, in this case) of existing businesses, considering the expected growth of those companies, and checked the NPV of cash flows. Compares the NPV of the cash flows from the existing with a current market capitalization business box. Companies with a market capitalization of current above the NPV of cash flows have a market award for innovation built into their shares.

4. Results and discussion

The survey results are in accordance with the methodology described above and includes the classifications made by Forbes and Corporate Knights, quantitative analysis of the relationship between group companies 1 and 2, and the qualitative analysis of products and processes.

4.1. Quantitative analysis

The most sustainable companies in the world are classified according to the ranking in figure 2.

Figure 2- Ranking Global 100 Most Sustainable Corporations in the World.

	Sustainable Companies	Score		Sustainable Companies	Score
1 ^o	Umicore SA	74,08%	51 ^o	Kesko OYJ	52,64%
2 ^o	Natura Cosméticos SA	73,78%	52 ^o	General Electric Co	52,63%
3 ^o	Statoil ASA	70,73%	53 ^o	City Developments Ltd	52,52%
4 ^o	Neste Oil OYJ	69,96%	54 ^o	Henkel AG & Co KGaA	52,38%
5 ^o	Novo Nordisk A/S	68,42%	55 ^o	LVMH Moët Hennessy	52,32%
6 ^o	Storebrand ASA	67,78%	56 ^o	National Australia Bank Ltd	52,22%
7 ^o	Koninklijke Philips Electronics NV	67,59%	57 ^o	Royal Dutch Shell PLC	51,88%
8 ^o	Biogen Idec Inc	67,17%	58 ^o	Canada National Railway Co	51,88%
9 ^o	Dassault Systemes SA	67,03%	59 ^o	Electrolux AB	51,38%
10 ^o	Westpac Banking Corp	66,12%	60 ^o	Motorola Solutions Inc	51,11%
11 ^o	ASML Holding NV	65,53%	61 ^o	TELUS Corp	51,09%
12 ^o	Outotec OYJ	65,30%	62 ^o	Prudential PLC	50,20%
13 ^o	Schneider Electric SA	64,65%	63 ^o	Galp Energia SGPS SA	50,11%
14 ^o	Intel Corp	63,58%	64 ^o	Eisai Co Ltd	50,10%
15 ^o	Sims Metal Management Ltd	63,11%	65 ^o	Wesfarmers Ltd	49,57%
16 ^o	Bayerische Motoren Werke AG	61,91%	66 ^o	Hang Seng Bank Ltd	49,48%
17 ^o	Adidas AG	61,03%	67 ^o	StarHub Ltd	49,38%
18 ^o	Atlas Copco AB	60,59%	68 ^o	Coloplast A/S	49,12%
19 ^o	Novozymes A/S	60,20%	69 ^o	Ramsay Health Care Ltd	48,95%
20 ^o	Cisco Systems Inc	58,68%	70 ^o	Renault SA	48,85%
21 ^o	Teck Resources Ltd	58,61%	71 ^o	Cie Generale d'Optique Essilor International SA	48,85%
22 ^o	Enagas SA	58,26%	72 ^o	Nexen Inc	48,48%
23 ^o	Daiwa House Industry Co Ltd	58,14%	73 ^o	AstraZeneca PLC	48,36%
24 ^o	Agilent Technologies Inc	57,83%	74 ^o	Hennes & Mauritz AB	48,33%
25 ^o	Croda International PLC	57,36%	75 ^o	Distribuição (Grupo Pão de Açúcar)	48,19%
26 ^o	Inditex SA	57,17%	76 ^o	Danone SA	47,76%
27 ^o	Scania AB	57,02%	77 ^o	UCB SA	47,61%
28 ^o	Alcatel-Lucent/France	56,95%	78 ^o	CapitaLand Ltd	47,56%
29 ^o	Acciona SA	56,93%	79 ^o	British Sky	47,15%
30 ^o	Telefonaktiebolaget LM Ericsson	56,88%	80 ^o	Enbridge Inc	47,13%
31 ^o	Siemens AG	56,82%	81 ^o	Electrocomponents PLC	47,09%
32 ^o	Centrica PLC	56,63%	82 ^o	Suncor Energy Inc	46,91%
33 ^o	Life Technologies Corp	56,41%	83 ^o	Unilever PLC	46,73%
34 ^o	Wolters Kluwer NV	56,05%	84 ^o	Stockland	46,71%
35 ^o	BASF SE	55,74%	85 ^o	Repsol SA	46,13%
36 ^o	Vivendi SA	55,43%	86 ^o	Sun Life Financial Inc	45,70%
37 ^o	BG Group PLC	55,42%	87 ^o	Shinhan Financial Group Co Ltd	45,65%
38 ^o	DNB ASA	55,39%	88 ^o	Royal Bank of Canada	45,08%
39 ^o	Aéroports de Paris	55,32%	89 ^o	Cenovus Energy Inc	44,92%
40 ^o	Barrick Gold Corp	55,10%	90 ^o	Prologis Inc	44,30%
41 ^o	Clorox Company/The	54,84%	91 ^o	Woodside Petroleum Ltd	44,19%
42 ^o	Accenture PLC	54,79%	92 ^o	Swiss Re Insurance Co Ltd	44,06%
43 ^o	Cia Energetica de Minas Gerais SA	54,64%	93 ^o	SAP AG	43,72%
44 ^o	Daimler AG	53,63%	94 ^o	Ricoh Co Ltd	43,67%
45 ^o	Australia & New Zealand Banking Group Ltd	53,60%	95 ^o	Nestle SA	43,63%
46 ^o	Geberit AG	53,50%	96 ^o	NEC Corp	43,12%
47 ^o	Sage Group PLC/The	52,84%	97 ^o	Insurance Australia	42,56%
48 ^o	Telenor ASA	52,83%	98 ^o	Banco Espírito Santo SA	42,09%
49 ^o	Vale SA	52,65%	99 ^o	Standard Bank Group of South Africa Ltd	41,37%
50 ^o	Kesko OYJ	52,64%	100 ^o	Campbell Soup Co	41,10%

In Figure 3 are the most innovative companies in the world according to the ranking by Forbes. Companies that are in yellow italics are those which belong to the top 100 most sustainable companies and the top 100 most innovative companies of 2013:

Figure 3- Ranking The World's Most Innovative Companies 2013

	Innovative Companies	Innovation premium		Innovative Companies	Innovation premium	
1º	Salesforce.com	75,10%	51º	Fresenius Medical Care	25,10%	1º
2º	Amazon.com	58,90%	52º	Secom	25,10%	2º
3º	Intuitive Surgical	57,60%	53º	Anheuser-Busch InBev	24,90%	3º
4º	Tencent Holdings	52,30%	54º	Adobe Systems	24,10%	4º
5º	Apple	48,20%	55º	Agilent Technologies	23,90%	5º
6º	Hindustan Unilever	47,70%	56º	HTC Corp	23,80%	6º
7º	Google	44,90%	57º	Kellogg	23,30%	7º
8º	Natura Cosméticos	44,50%	58º	Sandvik	23,30%	8º
9º	Bharat Heavy Electricals	43,60%	59º	ASML Holding	22,70%	9º
10º	Monsanto	42,60%	60º	Air Products & Chemical	22,30%	10º
11º	Reckitt Benckiser Group	40,60%	61º	Qualcomm	22,30%	11º
12º	Celgene	40,50%	62º	Richemont (Compagnie	22,20%	12º
13º	Nidec	40,00%	63º	SAP	22,10%	13º
14º	Terumo	38,00%	64º	Emerson Electric	22,00%	14º
15º	Infosys	37,10%	65º	Campbell Soup	22,00%	15º
16º	Pernod Ricard	36,60%	66º	Kao	21,90%	16º
17º	Keyence	36,10%	67º	Atlas Copco	21,90%	17º
18º	FMC Technologies	36,00%	68º	Danaher	21,70%	18º
19º	Starbucks	35,60%	69º	Corning	21,40%	19º
20º	Nintendo	35,00%	70º	Daikin Industries	21,30%	20º
21º	Alcon**	34,90%	71º	Thermo Fisher Scientific	21,20%	21º
22º	Activision Blizzard	34,60%	72º	Sany Heavy Industry	21,20%	22º
23º	Beiersdorf	34,50%	73º	Johnson Controls	21,20%	23º
24º	Procter & Gamble	33,40%	74º	Unilever NV	21,00%	24º
25º	Essilor International	33,20%	75º	Zoomlion Heavy Industr	20,90%	25º
26º	L'Oréal	33,10%	76º	Rolls-Royce Holdings	19,40%	26º
27º	Schlumberger	32,70%	77º	Oracle	19,30%	27º
28º	Ecolab	32,60%	78º	Fresenius SE	19,20%	28º
29º	Alstom	32,50%	79º	Syngenta	19,10%	29º
30º	ICL-Israel Chemicals	32,30%	80º	LeGrand	18,90%	30º
31º	General Mills	32,30%	81º	Schindler Holding	18,80%	31º
32º	CSL	32,10%	82º	Kraft Foods	18,60%	32º
33º	Colgate-Palmolive	32,00%	83º	Henkel	18,60%	33º
34º	NetApp	31,60%	84º	Intuit	18,20%	34º
35º	Danone	31,50%	85º	Cameron International	18,10%	35º
36º	Citrix Systems	30,40%	86º	Microsoft	18,00%	36º
37º	Areva	30,30%	87º	Automatic Data Processi	18,00%	37º
38º	Rockwell Automation	30,30%	88º	Maroc Telecom	17,70%	38º
39º	Kone	30,10%	89º	Precision Castparts	17,50%	39º
40º	China Oilfield Services	30,00%	90º	Air Liquide	17,40%	40º
41º	Synthes	29,60%	91º	Boston Scientific	17,00%	41º
42º	Juniper Networks	29,60%	92º	Tenaris	16,80%	42º
43º	Praxair	28,80%	93º	ABB	16,70%	43º
44º	Estée Lauder Cos	28,40%	94º	Toshiba	16,60%	44º
45º	Fanuc	28,30%	95º	Stryker	16,50%	45º
46º	Hershey	27,20%	96º	BAE Systems	16,50%	46º
47º	Avon Products	25,90%	97º	Halliburton	16,10%	47º
48º	Paccar	25,70%	98º	CA	16,10%	48º
49º	SMC Corp	25,50%	99º	Altera	16,10%	49º
50º	PepsiCo	25,40%	100º	ConAgra Foods	16,00%	50º

Regarding the quantitative analysis, results show no relationship between sustainability and innovation. The comparison of companies occurred with separation in groups of companies. In group 1 are sustainable **OR** innovative companies. And, in group 2 are sustainable **AND** innovative companies. In figure 4 is the result of the average T-test using the statistical program "Software Action".

Figure 4- Mean Test - Ranking Sustainable Companies

TEST T - INDEPENDENT SAMPLES	
<i>DATA PROCESS</i>	
<i>Information</i>	<i>Value</i>
T	-0,31173
Degrees of freedom	98
P-value	0,755907
Mean group 1	0,535285
Mean group 2	0,5438
Sample standard deviation of group 1:	0,074845
Sample standard deviation of group 2:	0,108828
Pooled standard deviation:	0,078175
Alternative Hypothesis: unlike	0
Confidence interval	95%
Lower limit	-0,06272
Upper limit	0,045693

Based on the average of (T - Student) test applied to the ranking of the most sustainable companies, there is no evidence to confirm the differences between the means, verified by high standard deviation and means close. So we may not affirm that there is a statistical difference between companies that are sustainable in comparison with companies that are part of the sustainability ranking and are also innovative.

Figure 4- Mean Test - Ranking innovative companies

TEST T - INDEPENDENT SAMPLES	
<i>DATA PROCESS</i>	
<i>Information</i>	<i>Value</i>
T	0,816137
Degrees of freedom	98
P-value	0,416401
Mean group 1	28,41209
Mean group 2	25,35556
Sample standard deviation of group 1:	10,92686
Sample standard deviation of group 2:	7,998767
Pooled standard deviation:	10,71786
Alternative Hypothesis: unlike	0
Confidence interval	95%
Lower limit	-4,37554
Upper limit	10,48861

Based on the average of (T - Student) test applied to the ranking of the most innovative companies, there is no evidence to confirm the differences between means, verified by high standard deviation and means close. So we can not say that there is a statistical difference between companies that are innovative in comparison with companies that are part of the innovation ranking and are also sustainable.

4.2 Qualitative analysis

For qualitative analysis, sustainable **AND** innovative companies (group 2) was deeply studied. Table 3 presents diversity of these companies in terms of industries, country of origin and size, They innovate in both product (table 5 and 7) and process (table 4 and 6).

Table 3- Sustainable Innovative Companies

Company	Description
Agilent Technologies Inc:	The leading company worldwide in analytical measurement and a leading technology for chemical analysis, life sciences, electronics and communications.
ASML Holding NV:	It is the world's leading provider of lithography systems for the semiconductor industry, manufacturing complex machines that are critical to the production of integrated circuits or chips. Is headquartered in Veldhoven, Netherlands.
Atlas Copco AB:	It is a leading industrial group in compressors, construction and mining equipment, industrial tools and assembly systems. The Group delivers sustainable solutions for increased customer productivity through innovative products and services.
Campbell Soup Co:	It is a producer of canned soups and related U.S. company. The products are sold to more than 120 countries.
Danone SA:	The Danone Group is a multinational, world leader in fresh dairy products, waters deputy leader, and children's hospital and nursing home French company.
Henkel AG & Co KGaA:	Henkel operates globally with leading brands and technologies in three business areas: Laundry & Home Care, Cosmetics / Toiletries, and Adhesive Technologies.
Natura Cosméticos SA:	100% Brazilian company, present in seven countries in Latin America and in France. It is an industry leader in the Brazilian market of cosmetics, fragrances, toiletries and direct selling.
SAP AG:	It is a company maker of business management software. Over four decades, SAP has evolved from a small, regional organization of global reach now
Unilever PLC:	It is one of the largest consumer goods companies in the world, a manufacturer of toiletries and cleaning, food and ice cream.

Companies that ranked in the top 100 Sustainable and Innovative companies.

Source: Authors

Table 4- Process Innovation

Company	Sustainable Innovation Level	Description
<i>Agilent Technologies Inc</i>	1	Agilent crosses organizational information in laboratories that are able to identify and enable synergies across Agilent's businesses to create competitive differentiation and customer value.
<i>ASML Holding NV</i>	2	Innovate in their production processes by implementing what they call "Shrink", which is the process of developing smaller transistors on chips, using techniques increasingly sophisticated lithography. The smaller the chip becomes, the more you can fit in a "wafer".
<i>Atlas Copco AB</i>	3	The company has innovated in the manufacturing process of tunnel fans. It was one of the pioneers in the world to change the design of the blades ventilation, allowing a smaller motor had the same flow and pressure systems more costly in terms of energy.
<i>Campbell Soup Co</i>	1	The change of the packaging process from steel drums to boxes "Goodpack" returnable for apple juice concentrate generate U.S. \$ 0.1 per box economy.
<i>Danone SA</i>	1	The company has innovated in the manufacturing process of plastic trays using smaller amount of PS (polystyrene) resin, adopting a technology adoption in the composition of O2, and reducing by

		about 19 % the weight of packaging products packaged in trays. The use of the material means no longer issue per year, approximately 3,556 tons of CO2, which is equivalent to planting 91,000 trees or 1.52 million gallons of gasoline.
<i>Henkel AG & Co KGaA</i>	3	In 2000, innovated in the manufacturing of glue "Pritt" process formulating the product based on renewable raw materials, reducing production costs.
<i>Natura Cosméticos SA</i>	4	Construction of Laboratory of Bio - Trials in Manaus - Brazil. The automated system that enables laboratory testing on a large scale through the analysis of high performance technologies, setting up a new process of conducting the tests.
<i>SAP AG</i>	1	From 2011 to 2012, reshaped some of the processes, reducing energy consumption (and thereby CO2) in a cost effective manner, increasing the use of renewable energy and employing compensation for some Scope 3 emissions. Reduced emissions of 490 to 480 000 tones.
<i>Unilever PLC</i>	1	Innovation in packaging production process, reducing the weight by 9.5 %, obtained through the combination of weight reduction and new materials, saving money in the production process.

Companies that ranked in the top 100 Sustainable and Innovative companies.

Source: Authors

Table 5- Product Innovation

Company	Level of Sustainable Innovation	Description
<i>Agilent Technologies Inc</i>	3	Innovated in a single product of ICP - MS system with a mass spectrometer mechanical, or MS/MS configuration.
<i>ASML Holding NV</i>	2	In 2012, a major priority was to innovate in light source improvements to scan "wafers" in machines sold by ASML. Chips are produced on wafers. These are silicon discs scanned by machines produced by ASML.
<i>Atlas Copco AB</i>	2	With the innovation of manufacturing process fans, Atlas Copco managed to innovate in the market offering a ventilation system of tunnels that use smaller motors with the same flow rate and pressure of engines from competing companies.
<i>Campbell Soup Co</i>	1	The company innovated in 2013 by launching a line of microwavable soups, exclusively through digital and social media such as Spotify, Tumblr, and the game Angry Birds.
<i>Danone SA</i>	2	In 2012, the company innovated by launching the Danone "Yolado" that unites the pleasure of an ice cream with the healthy attributes of yogurt and contains less than 100 calories - half the calories of a normal ice cream.
<i>Henkel AG & Co KGaA</i>	1	They innovated when they produced instant adhesives for industrial uses suitable to withstand temperatures above 120°C without compromising its overall performance improved formulations.
<i>Natura Cosméticos SA</i>	4	In 2000, they established the Natura Ekos line with the sustainable use of Brazilian biodiversity in the formulation of products.
<i>SAP AG</i>	1	The company innovated the analytical solutions, mobility, cloud computing and HANA growing 56 % in Brazil at software revenues and 72 % growth in lines of innovation.
<i>Unilever PLC</i>	2	Released in the USA, the innovative "Dove Moisturizing Body Wash" was formulated with high levels of emollients to combat moisture loss and help maintain a healthy skin barrier while bathing.

Companies that ranked in the top 100 Sustainable and Innovative companies.

Source: Elaborated by the authors

Table 6- Sustainable Innovation Process

Company	Level of Sustainable Innovation	Description
<i>Agilent Technologies Inc</i>	-	Not found on the website.
<i>ASML Holding NV</i>	4	At Linkou unit it was spared 20,000 m3 of water in 2012 by introducing an innovative system for the recovery of an ultrapure water (UPW) and a recycling system of waste heat, which led to a lower evaporation water cooling system.
<i>Atlas Copco AB</i>	3	The materials used in the production process and packaging of finished parts or products are tracked and included in reports. In terms of weight, the steel is more than 90% of the raw material used in production, which is largely recycled. The use of recycled steel for these raw materials offers an opportunity to reduce both operating costs as environmental impacts.
<i>Campbell Soup Co</i>	2	The redesign and innovation in the manufacturing process of packing "Cruskits" saved paper and it generated resources savings.
<i>Danone SA</i>	2	The company has innovated in the manufacturing process of plastic trays using smaller amount of PS (polystyrene) resin. The use of the material reduces per year, approximately 3,556 tons of CO2, which is equivalent to planting 91,000 trees or to not use 1.52 million gallons of gasoline.
<i>Henkel AG & Co KGaA</i>	3	They innovated with the implementation of an automotive pretreatment system called "The New Generation Coating (NGC) system" to replace the zinc phosphate, also to reduce environmental impact and processing costs.
<i>Natura Cosméticos SA</i>	3	In 1999, they innovated in the way of doing sustainable business by establishing the first partnership with traditional communities in the Amazon. The partnership is established with the Community Middle Juruá to supply andiroba.
<i>SAP AG</i>	2	From 2011 to 2012, reshaped some of the processes, reducing energy consumption (and thereby CO2) in a cost effective manner, increasing the use of renewable energy and employing compensation for some Scope 3 emissions.
<i>Unilever PLC</i>	4	In 2012, they indicated to open seven new plants in 2013, with changes in processes and eco - efficient design, capturing 50 % less water per tone of production compared to 2008 baseline data, generating water savings in the production process.

Companies that ranked in the top 100 Sustainable and Innovative companies.

Source: Elaborated by the authors

Table 7- Sustainable Product Innovation

Company	Level of Sustainable Innovation	Description
<i>Agilent Technologies Inc</i>	-	Not found on the website.
<i>ASML Holding NV</i>	2	The innovation on the process of "Shrink", they managed to offer machines that produce more chips per hour working continuously for long periods of time without the need for maintenance and with great savings of energy used in manufacturing per chip.
<i>Atlas Copco AB</i>	2	The company has innovated in the manufacturing process of tunnel fans. It was one of the pioneers in the world to change the design of the blades ventilation, allowing a smaller motor to have the same flow and pressure as systems with more costly energy.
<i>Campbell</i>	2	The innovative product line "Baked Naturals" was remodeled using

<i>Soup Co</i>		100% recyclable material.
<i>Danone SA</i>	2	In early 2013, the company launched in Portugal a more sustainable product: "Pitcher Family Savings"; it was equivalent to 6 bottles of yogurt, it was made with ecological material, which brings more convenience and it reduces the use of packaging product.
<i>Henkel AG & Co KGaA</i>	2	They offered a hot melt type of adhesive. When this hot melt was compared to conventional hot melt adhesives, it showed the reduction of energy consumption from 25% to 40%. Furthermore, a low application temperature reduces energy use by more than 50%.
<i>Natura Cosméticos SA</i>	3	In 1983, an innovative and pioneering initiative was done. They were the first cosmetics company to offer refillable products.
<i>SAP AG</i>	4	The software and services from SAP and its partners help to have better view of energy and resources. It gives visibility to asset utilization and energy usage, identifying opportunities for cost reduction and binding factory control systems to operational performance monitoring, contributing to lower the energy use and the reduction of CO2 emissions.
<i>Unilever PLC</i>	4	In 2012, the company launched the "Comfort One Rinse" a softener for clothes that was easier to rinse, therefore, it contributed to the process of water consumption reduction.

Companies that ranked in the top 100 Sustainable and Innovative companies.

Source: Elaborated by the authors

5. Conclusions

This research has some contributions. One of them is that after the research based on global rankings, it was noticed that the group of nine companies out of one hundred best companies, in addition to being concerned with sustainability issues also uses innovation to achieve significant results. These results lead them to increase their participation in the market, and to achieve a sustainable development.

Another contribution is made on the fact that the research results confirm the importance of innovation in processes and products through the systematization proposed by authors such as Stevels (1997) among others. Yet, it is confirmed that an innovative and sustainable business can lead to offer new products and services to the market to meet the environmental, social and economic dimensions. According to Barbieri and Simantob (2007), the company must not deviate from its mission statement and vision, but these must be aligned to a goal that considers the impact of the company's production process in the environment in which it operates.

This study has limitations as to the scope of its results, either because it is based on secondary data, which has not been possible to obtain more accurate data to relate the independent variables and thus to verify the correlation of the two groups surveyed. Or, because the necessary advances to a deeper understanding of some variables still depend on new research in the fields of sustainability and innovation. In this sense, it is recommended that future studies examine in more detail how the environmental bias drives innovation on processes and products.

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